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The characteristics of older homicide offenders: a systematic review

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This systematic review was conducted to develop a broader understanding of the characteristics of older people who commit homicide. PubMed, Embase and PsycINFO were searched on 28 November 2018 for studies on homicides committed by people aged 55 years and over. Only articles published in English were included. Studies focusing on euthanasia and palliation were excluded. Fifteen articles met the inclusion criteria, with studies from the United States ($n = 6$), United Kingdom ($n = 2$), Australia, Canada, Finland, Italy, New Zealand, Switzerland and Turkey. The age range for 'older offenders' varied across the studies. Some studies examined the phenomena of sexual homicide and homicide-suicide. Offenders were more likely to be male, and the domestic setting for the offence was common. Social maladjustment, a care-giver role, personal physical and mental health problems and/or substance misuse issues were relevant to the offenders. Firearms-related homicides were common. Homicide committed by older people is rare but there may be a constellation of risk factors specific to this age group that needs further understanding. Our findings suggest that there is an increasing need for care of older offenders and a need for specialist forensic services for elderly offenders.

Keywords: elderly; homicide; murder; offenders; older people; psychiatric; victim.

Introduction

Rationale

Australia is continuing to experience a growing trend for longer life expectancy (Australian Institute of Health & Welfare, 2017; Blowers, 2015) and is in the top third of the Organisation for Economic Co-operation and Development (OECD) countries for life expectancy (Australian Institute of Health & Welfare, 2018). It has long been known that older people have been victims of neglect and criminal activity (NSW Health, 2018). Conversely, older people also commit offences, albeit at lower rates than younger adults (Berger, 2018; Blowers, 2015).

Aday (2003) wrote about the growing impact of the ageing cohort in the prison system. An ageing prison population brings with it a number of challenges (Baidawi et al., 2011) including increased cost of incarceration, age-related functional decline and illness, a lack of appropriate and meaningful programmes for older prisoners and release and resettlement issues once older inmates

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leave prison. Another consideration is the acceleration of the ageing process among prisoners which is generally attributed to a combination of the lifestyle of offenders prior to entering prison (such as poor nutrition, substance misuse and poor access to medical care) and factors within the custodial setting that may escalate age-related illnesses and conditions (Trotter & Baidawi, 2015).

There have been a limited number of studies exploring the characteristics of older homicide offenders (Reutens et al., 2015). This may be because of the emphasis on juvenile crime and the misconception that most people end their criminal careers with increased age (Stanback & King-Kallimanis, 2011). Studies of the psychiatric status of violent offenders revealed a very low proportion of homicidal patients to be elderly (Feldmeyer & Steffensmeier, 2013; Ticehurst et al., 1994).

An Australian study of elderly patients presenting to a public psychiatric hospital with homicidal behaviour revealed a high prevalence of organic impairment (Ticehurst et al., 1992). The patients in that study were admitted to hospitals in preference to involvement with the criminal justice system.

Feldmeyer & Steffensmeier (2013) found that elderly homicide offending patterns often differ from offending by younger perpetrators, and they related this to the routine activities of older populations. They found that, compared with younger offenders, homicides by older offenders are more likely to occur in private homes than public spaces and are less likely to eventuate from other criminal offenses. Salari & Maxwell (2016) reported that homicides by older people more often involve victims who are female, family members or acquaintances (rather than strangers) and are elderly themselves. They suggested that family violence and abuse is prevalent but is often secretive in nature. This is supported by Wijeratne & Reutens (2016), who reported that there were different paradigms for elder abuse and domestic violence when compared to younger age groups and also differences in the services available to address these problems. These paradigms are associated with age-specific characteristics, with very different implications for management when compared to younger age groups (Salari & Maxwell, 2016).

Researchers on spousal homicide among older adults found that perpetrators had often experienced overburden in providing care for a spouse with a long-term illness or disability (Malphurs & Cohen, 2005; Salari & Maxwell, 2016), and close to 10% of victims had dementia (Salari, 2007).

O'Dwyer, Moyle, Zimmer-Gembeck et al. (2016) found that one in six family carers of people with dementia have seriously contemplated suicide. O'Dwyer, Moyle, Taylor, et al. (2016) further commented that although homicidal thoughts do not necessarily lead to homicidal acts, the absence of data on homicidal ideation during the caregiving journey is a considerable gap in the existing literature and may be hindering efforts to prevent deaths by homicide.

Other researchers have shown that the victims of older offenders tend to be known to the offender (Barak et al., 1995; Kratcoski, 1990; Newman et al., 1984). Aday (2003) proposed that violent behaviour within the family may not temper with age and also that a violent crime in later life may be the result of anger or frustration. This may be in the context of the onset of chronic health conditions which result in dependence and other losses (Stanback & King-Kallimanis, 2011). Some older offenders have reported having a substance abuse problem (Arndt et al., 2002; Gates et al., 2018), which can be associated with their physical and mental health issues and have implications on patterns of violent behaviour.

An extreme but contemporary case of the older homicide offender is that of Stephen Paddock. Paddock was a 64-year-old retired accountant who on 1 October 2017 was responsible for the killing of 58 attendees of the *Harvest Music Festival* being held on Las Vegas Boulevard. It is understood that

Paddock used a series of modified assault rifles and fired multiple rounds aimed at the crowds below from his 32nd floor hotel room before shooting himself (Haag, 2019). Sheriff Lombardo (2018) reported that Paddock's primary care physician described his presentation to him in 2016 as 'odd' in behaviour with 'little emotion' shown. His physician believed Paddock's presentation had characteristics of bipolar disorder, however, Paddock was unwilling to elaborate on his symptoms. Paddock was offered anti-depressant medication but declined and instead accepted prescriptions for 'anxiety'.

Objective

The objective of this research was to conduct a systematic review of world-wide studies that investigated older perpetrators of homicide. In this review, the authors examined characteristics of the offender, the victim and the circumstances around the offence. Particular interest was given to the quality of the offender-victim relationship, their health status and types of homicides committed.

Materials and methods

Data for examining the characteristics of older people who commit homicide was compiled by following the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009). The following databases were used in the search: PubMed, Embase and PsycINFO. A search was conducted on 28 November 2018 identifying all published articles in the English language.

Eligibility criteria

Inclusion criteria

- Studies reporting homicide offenders who were aged 55 years and older. Various organisations throughout the world have considered older age to be around 50–65 years of age and above. An arbitrary cut-off of 55 years of age was used for the purpose of this study.
- Studies in English available up to 28 November 2018.
- Studies that reported all known homicides by older people in a defined population.
- Studies that reported information about the characteristics of the offenders.

Exclusion criteria

- Case histories and small personal series based on groups of institutionalised patients.
- Studies that did not describe any characteristics of the homicide offenders.
- Studies where there was no differentiation between offenders aged above and below 55 years.
- Studies that only reported data collected from newspaper reports and other media sources.
- Studies that did not discriminate between attempted and completed homicides.
- Studies focusing on euthanasia and deaths related to palliative care.

Given the small number of studies available, the authors did not exclude any study on the grounds of methodological quality.

Search

The search strategy combined terms from two domains:

1. The age domain, including the following terms: aged, older, elder*, geriatric
2. The homicide domain, including the following terms: homicid*, murder*, filicid*, prolicid*, matricid*, patricid*, mariticid*, fratricid*, sororicid*, parricid*, uxoricid*, eldercid*, siblicid*, femicid*

	AGE DOMAIN	HOMICIDE DOMAIN
PUBMED	Aged[mh] OR aged[tiab] OR older[tiab] OR elder*[tiab] OR geriatric[tiab]	Homicide[mh] OR homicid*[tiab] OR murder*[tiab] OR filicid*[tiab] OR prolicid*[tiab] OR matricid*[tiab] OR patricid*[tiab] OR mariticid*[tiab] OR fratricid*[tiab] OR sororicid*[tiab] OR parricid*[tiab] OR uxoricid*[tiab] OR eldercid*[tiab] OR siblicid*[tiab] OR femicid*[tiab]
EMBASE	aged/exp OR aged:ti,ab OR older:ti,ab OR elder*:ti,ab OR geriatric:ti,ab	Homicide/exp OR homicid*:ti,ab OR murder*:ti,ab OR filicid*:ti,ab OR prolicid*:ti,ab OR matricid*:ti,ab OR patricid*:ti,ab OR mariticid*:ti,ab OR fratricid*:ti,ab OR sororicid*:ti,ab OR parricid*:ti,ab OR uxoricid*.ti,ab OR eldercid*.ti,ab OR siblicid*.ti,ab OR femicid*.ti,ab[**AQ7**]
PSYCINFO	Aged.sh OR aged.ti,ab OR older.ti,ab OR elder*.ti,ab OR geriatric.ti,ab	Homicide.sh OR homicid*.ti,ab OR murder*.ti,ab OR filicid*.ti,ab OR prolicid*.ti,ab OR matricid*.ti,ab OR patricid*.ti,ab OR mariticid*.ti,ab OR fratricid*.ti,ab OR sororicid*.ti,ab OR parricid*.ti,ab OR uxoricid*.ti,ab OR eldercid*.ti,ab OR siblicid*.ti,ab OR femicid*.ti,ab

Figure 1. Database search strategy in PubMed, Embase & PsycInfo.

The strategy was consistent across databases, except where minor modifications were needed to respond to the different characteristics of the databases. Figure 1 represents the search strategy for the databases used.

Study selection

Eligibility assessment was performed by the primary author independently and unblinded in a standardised manner. Contention regarding the suitability of studies against the eligibility criteria was resolved by seeking the opinion of the third co-author; if no agreement could be reached, it was planned that the second co-author would decide.

Data collection process

Information was extracted by the authors from each included study regarding the characteristics of the offenders (including age, mental health conditions, general health conditions and history of violence), types of homicides,

weapons used, the social context of the victim-offender relationship and the clinical and legal disposition of the offender.

Results

Study selection

There were 6454 articles found from the search of PubMed, Embase and PsycINFO databases. Of these, 2068 articles were found to be duplicates and were removed. There were 3979 abstracts not reviewed, as the article title indicated a lack of relevance, eg articles on euthanasia and articles focusing on non-relevant age groups. The primary author screened the 407 abstracts of which 213 articles were deemed not to fit the objective of this study for reasons including having no information regarding older offenders, studies lacking in quantitative data and unsuitable study design, eg using case histories and personal case series. The remaining 194 articles were reviewed in full text independently, and 179 were excluded from this review for reasons such as lacking appropriate data, studies that did not discriminate between younger and older offenders and unsuitable study design, eg did not differentiate between attempted and completed homicide. Fifteen studies were included in the final analysis. Figures 1 and 2 provides details of the search strategy.

Study characteristics

Study characteristics and key findings are presented in Table 1. There were studies carried out in the United States ($n = 6$) (Block, 2013; Fazel et al., 2007; Goetting, 1992; Kratcoski, 1990; Malphurs & Cohen, 2005; Myers et al., 2017), the United Kingdom ($n = 2$) (Hunt et al., 2010; Overshott et al., 2012) and one each in Australia (Reutens et al., 2015), Canada (Bourget et al., 2010), Finland (Putkonen et al., 2010), New Zealand (Cheung et al., 2016), Italy (Verzeletti et al., 2014) Switzerland (Shiferaw et al., 2010) and Turkey (Lewis et al., 2006).

It was noted that analysis of the same population was used in Block (2013) and Fazel et al. (2007) using the Chicago Homicide Data set. Similarly, Overshott et al. (2012) and Hunt et al. (2010) studied data in the United Kingdom over a common time period; as did Kratcoski (1990) and Goetting (1992) in Detroit.

Some of the included studies additionally looked at offenders aged below 55 years (Fazel et al., 2007; Hunt et al., 2010; Myers et al., 2017; Shiferaw et al., 2010; Verzeletti et al., 2014). The age range for 'older' offenders varied between the studies. The studies examined older offenders in the corresponding age groups: 55 and over (Goetting, 1992; Malphurs & Cohen, 2005; Myers et al., 2017; Reutens et al., 2015), 60 and over (Block, 2013; Fazel et al., 2007; Kratcoski, 1990; Lewis et al., 2006; Overshott et al., 2012; Putkonen et al., 2010) and 65 and over (Bourget et al., 2010; Cheung et al., 2016; Hunt et al., 2010). Myers et al. (2017) further subdivided the age groups into 55–60 years and 60 years and over. Similarly, Overshott et al. (2012) examined sets of offenders between the ages of 60–64 years and 65 years and over. Reutens et al. (2015) reported the number of offenders within the following age groups: 55–59 years, 60–69 years, 70–79 years and 80 years and over, but did not differentiate between them when describing the characteristics.

The studies included presented a pattern that older homicide offenders are much more likely to be male than female. Myers et al. (2017) reported on cases of sexual homicide perpetrated by male offenders. Other studies included data on the phenomenon of the homicide-suicide dyad (Block, 2013; Bourget et al., 2010; Fazel et al., 2007; Kratcoski, 1990; Putkonen et al., 2010). Some studies only included offenders who committed homicide-suicide (Cheung et al., 2016; Malphurs & Cohen, 2005; Shiferaw et al., 2010; Verzeletti et al., 2014). In contrast, Hunt et al. (2010) excluded cases of homicide-suicide from a

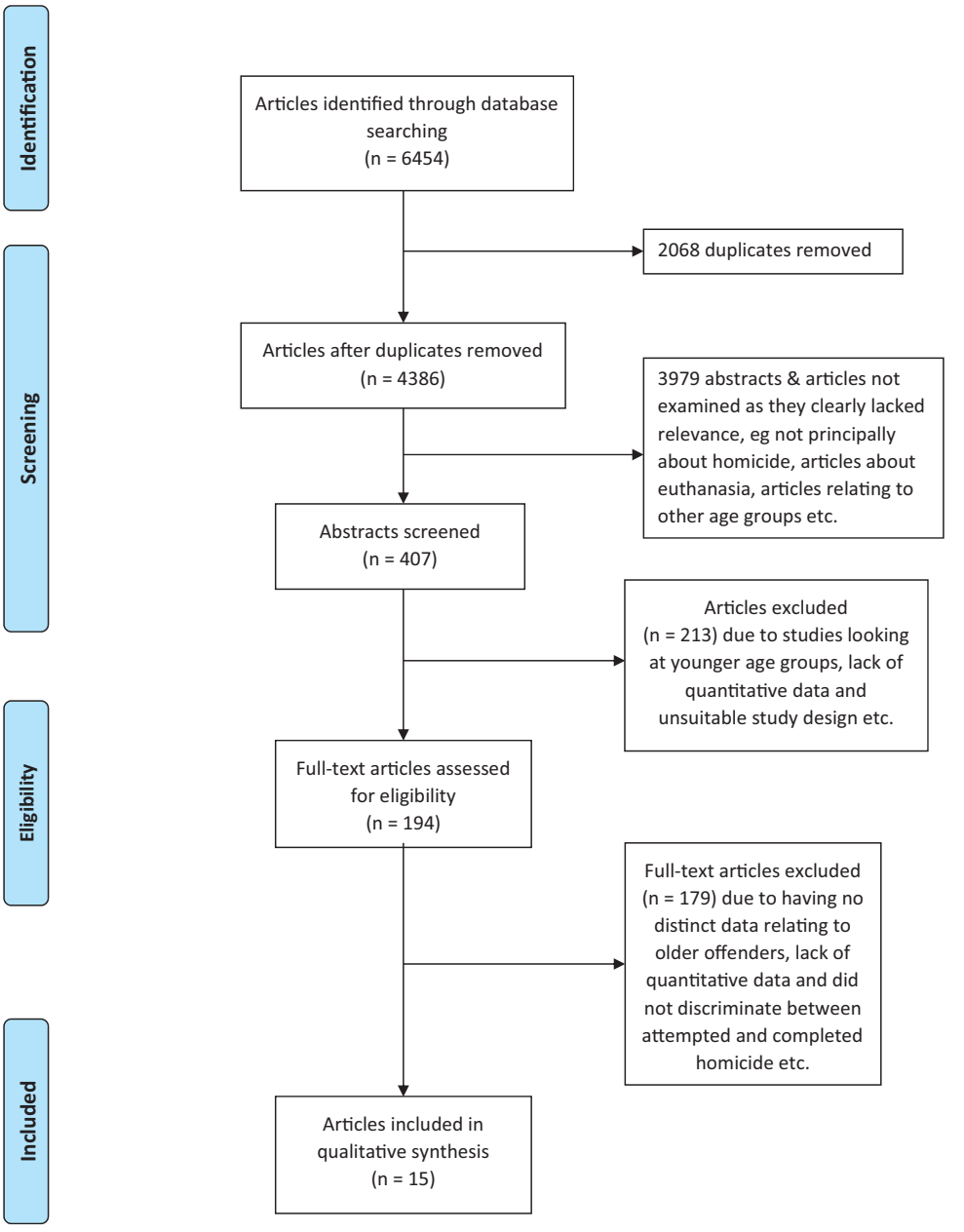

Figure 2. Search strategy.

legal point of view, as the offender had died prior to a conviction being made.

Table 2 presents data from the articles that focused on older offenders who committed homicide-suicide. There were 33 offenders in total, and all of the cases involved the homicide of a spouse/partner or a domestic relation. There was one case where the victim was the sister of the offender (Cheung et al., 2016) and two cases where the victim was the daughter

Table 1. Basic demographics & findings.

Study	Place	Dates	Offender age	Older homicide offenders	Male homicide offenders	Female homicide offenders	Key findings
Aliustaoğlu et al. (2011)	Turkey	2000–2005	60 years and above	83	N/A	N/A	Voluntary manslaughter in this population was statistically more common in healthy subjects compared to those subjects diagnosed as mentally ill ($p < 0.02$). Healthy cases used firearms more frequently compared to those diagnosed as mentally ill ($p = 0.004$)
Block (2013)	Chicago	1965–2000	60 years and above	476	422	54	Elderly male offenders were more likely than younger adult male offenders to have killed an intimate partner. Intimate partner homicide: 84 men; 28 women. 338 males killed acquaintance (21.9%), friend (16.6%), stranger (12.1%), son (6.5%), neighbour (4.4%), sexual rival (3.6%), roommate (3.0%), son-in-law (2.7%), customer (2.7%) and landlord (2.4%). 26 women killed friend (19.2%), acquaintance (11.5%), neighbour (11.5%), neighbour in an apartment building (7.7%), stranger (7.7%) and cousin/son-in-law/daughter-in-law/child being watched/roommate/patient/tenant/landlady/business partner (3.8% each)
Bourget et al. (2010)	Quebec	1992–2007	65 years and above	27	25	2	The homicide was frequently followed by the suicide of the perpetrator. Several victims had pre-existing medical illnesses, indicating that the offences may have been committed by individuals who were caregivers to chronically ill spouses. At the time of the offense, most of the perpetrators had a mental illness, usually depressive disorder, but few had received psychiatric help. Most of the homicides ($n = 25$, 93%) took place in the victims' homes
Cheung et al. (2016)	New Zealand	July 2007–December 2012	65 years and above	4	4	0	All perpetrators were men; three had been farmers. One case occurred in the context of an underlying psychiatric illness (psychotic depression in BPAD). Firearms were used in three cases. Two cases were categorised as spousal/consortial subtype, one case as filicide-suicide, and one case as siblicide-suicide. The prospect of major social upheaval in the form of losing their homes was present in all four cases
Fazel et al. (2007)	Chicago	1965–1995	60 years and above	443	393	50	Elderly killers were more likely to be white and to commit suicide afterwards. Their victims

(*Continued*)

Table 1. (*Continued*).

Study	Place	Dates	Offender age	Older homicide offenders	Male homicide offenders	Female homicide offenders	Key findings
							were more likely to be spouses, female and aged over 60 years
Goetting (1992)	Detroit	1982–1983	55 years and above	45	40	5	Older offenders are more likely than younger offenders to kill in a private residence. Most homicides arose from domestic discord and from petty quarrels between friends, neighbours and acquaintances. There was evidence of prosecutorial leniency in the determination of criminal processing outcomes
Hunt et al. (2010)	England and Wales	1997–2004	65 years and above	62	58	4	Perpetrators aged 65 and over were more likely to use strangulation/suffocation, and the victim was more often female and a family member or spouse. Older perpetrators had high rates of affective disorders and were more likely to be mentally ill at the time of the offence
Kratcoski (1990)	Cuyahoga County, Ohio; Cincinnati, Ohio; Detroit, Michigan	1970–1985	60 years or older	179	146	33	The victim and assailant were known to each other in 89% of all cases. In 25% of cases, one spouse was killed by the other. 74% of homicides occurred in the home. All homicide-suicide incidents reported (9%) involved a suicide by a husband after he murdered his wife. 44% of elderly homicide offenders were under the influence of alcohol and both the victim and offender were drinking in 40% of cases. Firearms were the cause of death in 86% of cases and stabbing occurred in 11% of cases
Malphurs and Cohen (2005)	Florida	1 Jan 1998–31 Dec 1999	55 years and above	20	20	0	Homicide-suicide perpetrators displayed significantly more domestic violence or were caregivers for their wives, compared to matched suicide controls. 65% of perpetrators had reported depressed mood. 40% of homicide-suicide perpetrators were caregivers for their wives. All perpetrators were married men who used a firearm
Myers et al. (2017)	United States	1976–2012	55 years and above	32	32	0	Murders by older sexual homicide offenders accounted for only 0.5% of United States sexual homicides. Over two-thirds of older sexual homicide offender victims were aged 40 years or more, and one third were aged 55 years or more
Overshott et al. (2012)	United Kingdom	1 April 1996–31 March 2001	60 years and above	47	43	4	Homicides perpetrated by older people typically involved a man killing his partner in an impulsive manner. The most common method was by using a sharp instrument (34%),

(*Continued*)

Table 1. (*Continued*).

Study	Place	Dates	Offender age	Older homicide offenders	Male homicide offenders	Female homicide offenders	Key findings
							followed by the use of a blunt instrument (26%). The use of firearms was rare (11%). Perpetrators over 65 years were significantly more likely to kill a current or former spouse/ partner and less likely to kill an acquaintance. 44% of perpetrators over 65 years suffered from depression at the time of the offence, whereas the rates of schizophrenia and alcohol dependence were low
Putkonen et al. (2010)	Finland	1995–2004	60 years and above	25	22	3	Homicide offenders aged 60 years or older were diagnosed less often than gender-matched younger homicide offenders with drug dependence and personality disorders and more often with dementia and physical illnesses. The mean Psychopathy Checklist-Revised total scores as well as factor and facet scores were lower in the 60 or older age group
Reutens et al. (2015)	New South Wales	1993–2010	55 years and above	70	57	13	The proportion of male offenders and rates of firearm use were similar to other age groups. 12 of the 14 homicides using guns occurred outside the metropolitan area. Older offenders were more likely to have cognitive impairment or psychotic illnesses. Victims were more likely to be female and in a domestic relationship with the offender
Shiferaw et al. (2010)	Geneva	1 Jan 1956–31 Dec 2005	62 years and above	3	3	0	Three cases of homicide-suicide perpetrators were aged over 55 years of age. In all three cases, the victim was a spouse or intimate partner
Verzeletti et al. (2014)	Brescia County, Italy	Jan 1987–Dec 2012	55 years and above	6	6	0	Six cases of homicide-suicide perpetrators were over 55 years of age. Five of the victims were the wives of the offender and one was the lover. Firearms were used in three of the homicides, whereas firearms were used in five of the suicides. All the homicides occurred in the home. Significant illnesses were experienced by the older couple in four of the cases and morbid jealousy was the motive in one case

Table 2. Studies on homicide-suicide.

Study	Male offenders	Female offenders	Male victim	Female victim	Spouse/ domestic relation	Caregiver role	Firearm	Other weapon	Affected by alcohol	PPsychHx	Psychotic episode	Mood disorder	Medical illness	Possible precipitating factor & antecedents
Cheung et al. (2016)	4	0	1 (father-in-law)	4 (2 spouses, 1 sister, 1 disabled daughter)	4 (2 spouses, 1 sibling, 1 daughter)	1	3	0	N/A	2	N/A	1 (BPAD)	1	2 relationship separations; depression & forced sale of property
Malphurs and Cohen (2005)	20	0	0	20	all spouses or consortial relationship	8 providers, 0 recipients	20	0	3	N/A	N/A	depressed mood ($n = 13$)	at least 17 had atherosclerosis	65% ($n = 13$) experienced depressed mood; 60% ($n = 12$) had physical health problem(s); 40% ($n = 8$) were care providers to victim; 25% ($n = 5$) had a domestic violence history; 20% ($n = 4$) had a recent illness; 10% ($n = 2$) experienced financial stress
Shiferaw et al. (2010)	3	0	0	3	3 (2 spouses, 1 intimate partner)	N/A	N/A	N/A	1	N/A	N/A	depression ($n = 2$)	N/A	frustration in life; altruistic act (illness in victim); jealousy, fear of imminent separation
Verzeletti et al. (2014)	6	0	0	7	7 (5 wives, 1 daughter, 1 lover)	N/A	2	1 cattle prod, 3 ligature strangulations	N/A	N/A	N/A	N/A	N/A	4 significant illnesses, 1 morbid jealousy

of the offender (Cheung et al., 2016; Verzeletti et al., 2014) – the victim in the former study was disabled. Malphurs and Cohen (2005) found that 8 (40%) of the offenders in their study were performing a carer role to the victim, and 5 cases (25%) had a history of domestic violence. Firearms were commonly used by the offenders in the three studies that reported firearm and weapon use. Malphurs and Cohen (2005) found that firearms were used in all 20 of the homicides in their United States study. Verzeletti et al. (2014) found that all of the homicides occurred at home in their Italian study.

Table 3 presents data on the offenders' health and mental health status. Bourget et al. (2010) found that several offenders (10 from 11 available offender records) had medical illnesses and proposed that the offences may have been committed by individuals who were caregivers to chronically ill spouses. There were only two studies that identified whether the offender had a care-giver role towards the victim – one (25%) offender was found by Cheung et al. (2016) and eight (40%) offenders by Malphurs and Cohen (2005). Kratcoski (1990) reported 'several' cases of the spouse (victim) suffering from painful terminal illness and the husband (offender) being unable to cope with the situation. A past history of psychiatric conditions in offenders was reported in the following studies: 2 (50%) (Cheung et al., 2016); 36 (58%) (Hunt et al., 2010); 82 (46%) (Kratcoski, 1990) and 12 (48%) (Putkonen et al., 2010). Furthermore, Bourget et al. (2010); Cheung et al. (2016); Hunt et al. (2010); Malphurs and Cohen (2005); Overshott et al. (2012); Putkonen et al. (2010); Reutens et al. (2015) and Shiferaw et al. (2010) reported on episodes of mental illness at the time of the offence presented in Table 3. Court outcomes were described in several studies (Hunt et al., 2010; Kratcoski, 1990; Overshott et al., 2012). Overshott et al (2012) found that, compared to the 60–64 years age group, perpetrators of 65 years and over were less likely to receive a custodial sentence and more likely to be ordered to remain in hospital.

Table 4 presents information from studies detailing the offender relationship with the victim, precipitating factors, use of weapons and violent antecedents. As the table highlights, in a large proportion of cases, a domestic relationship existed between the offender and victim – usually spousal or intimate partner. The precipitating factors for the offence were presented in several studies (Block, 2013; Goetting, 1992; Kratcoski, 1990; Shiferaw et al., 2010; Verzeletti et al., 2014).

The use of firearms to commit homicide was not uncommon (Bourget et al., 2010; Cheung et al., 2016; Fazel et al., 2007; Goetting, 1992; Hunt et al., 2010; Kratcoski, 1990; Malphurs & Cohen, 2005; Myers et al., 2017; Overshott et al., 2012; Putkonen et al., 2010; Reutens et al., 2015; Verzeletti et al., 2014). Fazel et al. (2007) reported on specific types of firearms used: automatic handgun ($n = 48$, 11%), handgun ($n = 210$, 47%), rifle ($n = 9$, 2%), shotgun ($n = 26$, 6%) and unknown firearm ($n = 11$, 2%). Some studies reported on the use of non-firearm weapons (Bourget et al., 2010; Fazel et al., 2007; Goetting, 1992; Hunt et al., 2010; Kratcoski, 1990; Myers et al., 2017; Overshott et al., 2012; Putkonen et al., 2010; Reutens et al., 2015; Verzeletti et al., 2014). Prior violent offender history and convictions were reported in some studies (Block, 2013; Fazel et al., 2007; Hunt et al., 2010; Malphurs & Cohen, 2005; Putkonen et al., 2010; Reutens et al., 2015).

Risk of bias within studies

- The included studies used secondary data, that is, information collected by government departments, organizational records and data etc that was originally collected for other research purposes. The infrequency of homicides committed by older people needs

Table 3. Offender health & mental health status.

Study	Older homicide offenders	Offender caregiver role	Homicide-suicide	Past psychiatric history	Affected by alcohol	Psychotic episode	Mood disorder episode	Cognitive impairment	Medical illness	Court outcome & disposition	Psychiatric reports
Aliustaoğlu et al. (2011)	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	21 mentally ill; 62 healthy	N/A
Bourget et al. (2010)	27	N/A	19 (70%)	N/A	1	2	15 (56%)	N/A	pre-existing medical illness in 10 of 11 available victim records	N/A	N/A
Cheung et al. (2016)	4	1	4 (100%)	2	N/A	N/A	1 (25%)	N/A	N/A	N/A	N/A
Hunt et al. (2010)	62	N/A	N/A	5 schizophrenia; 25 affective disorders; 6 history of alcohol misuse	N/A	7 delusions at time of offence; 3 had hallucinations	27 depression	3 dementia	N/A	17 convicted of murder, 25 manslaughter; 17 manslaughter sect 2 (diminished responsibility); 2 unfit to plead; 1 legally insane. 30 imprisoned; 15 hospitalised; 18 other	psychiatric reports available for 54% of offenders
Kratcoski (1990)	179	N/A	15 (9%)	82 (46%)	82 (44%) offenders; 72 (40%) both were drinking	N/A	N/A	N/A	N/A	4 NGRMI; 37 offenders never went to trial (some went to mental hospital)	N/A
Malphurs and Cohen (2005)	20	8	20 (100%)	N/A	3	N/A	13 depressed mood	N/A	at least 17 had atherosclerosis	N/A	N/A
Overshott et al. (2012)	47	N/A	11 (23%)	N/A	8	2	11 depression	9 dementia	N/A	13 (28%) murder; 17 (36%) manslaughter/diminished responsibility; 14 (30%) manslaughter - other/self-defence. 27 (57%) prison; 9 (19%) hospital order; 11 (23%) non-custodial sentence	36 had psychiatric reports
Putkonen et al. (2010)	25	N/A	3 (12%)	12	20	3	N/A	5	12	N/A	N/A
Reutens et al. (2015)	70	N/A	N/A	N/A	15 of 16 offenders with previous alcohol use disorder were intoxicated	13 (6 had delusions of infidelity)	N/A	21 (30%)	34 (49%)	N/A	N/A
Shiferaw et al. (2010)	3	N/A	3 (100%)	N/A	1	N/A	2	N/A	N/A	N/A	N/A
Verzeletti et al. (2014)	6	N/A	6 (100%)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table 4. Offender relationship with the victim, precipitating factors, use of weapons and violent antecedents.

Study	Spouse/domestic relation	Precipitating factor	Firearm	Other weapon	Prior violent convictions
Kratcoski (1990)	43 (25%) spouses; 24 (14%) relatives; 88 (50%) acquaintances; 20 (11%) strangers	152 (81%) quarrel; 10 (6%) felony; 21 (13%) other	86%	11% stabbings	N/A
Malphurs and Cohen (2005)	all spouses or consortial relationships	N/A	20	N/A	5 (25%) domestic violence history
Myers et al. (2017)	2 intimate partners; 2 family members; 17 friends/ acquaintances, strangers	N/A	7	21 (8 personal weapons; 4 contact weapons/blunt objects; 8 edged weapons; 1 other weapon)	N/A
Overshott et al. (2012)	25	N/A	5 (11%)	15 sharp instruments, 12 blunt instruments	N/A
Putkonen et al. (2010)	8	N/A	2 shootings	15 stabbings	9 (36%) previous violent offending
Reutens et al. (2015)	48 (69%); 41 intimate partners; 1 couple killed disabled son	N/A	14 (20%)	stabbing (27, 39%); beating (11, 16%); strangulation; suffocation; fire; poison	8 had violent convictions
Shiferaw et al. (2010)	2 spouses, 1 intimate partner	frustration in life; altruistic act (illness in victim); jealousy, fear of imminent separation	N/A	N/A	N/A
Verzeletti et al. (2014)	5 wives, 1 daughter, 1 lover	4 significant illnesses, 1 morbid jealousy, 1 unknown	2	1 cattle prod, 3 ligature strangulations	N/A

to be borne in mind as a possible explanation for this.

- Across the studies, there was variability in the physical health, mental health and substance misuse data available regarding the offenders. Some studies had incomplete information in this regard for their study groups. For instance, Hunt et al. (2010) found that only 54% of offenders in their study had a psychiatric report available. There was also variability and incomplete information regarding the contemporaneous relationship of these impairments in relation to the offending.
- There was uncertainty about the reliability of the diagnosis of psychiatric and general medical conditions. Some reported the existence of a condition but there was insufficient detail regarding how these diagnoses were arrived at and by whom.
- Some studies used varied age subsets, such as offenders above and below 60 years (Fazel et al., 2007); and offenders between the ages of 45–64 years and 65 years and over (Hunt et al., 2010). This meant that not all data for all the offenders aged 55 and over in those studies could be included in this review.
- Kratcoski (1990) examined cases of non-justifiable homicides as opposed to all types of homicide.

Risk of bias across studies

The methodology of reporting homicides and sources of data varied across the studies, eg from police records, coronial services and medical examiner offices. Missing data was a feature of some of the studies, for example, with regard to psychiatric and general health history where there were incomplete records across the sample. Hunt et al. (2010) excluded cases of homicide-suicide on the basis that a suicided individual could not be convicted of homicide. The other studies did not exclude these types of cases in their analyses.

Discussion

The present study aimed to review the existing literature regarding older homicide offenders and examine the characteristics and context involved. The authors reviewed 15 studies that detailed characteristics of older homicide offenders. These studies were published between 1990 and 2017. To the authors' knowledge, this is the first systematic review of this topic.

This review found that, in common with younger offenders, the older offenders were more likely to be male. The domestic setting has been found to be the most likely location for older offenders committing homicide (Barak et al., 1995; Kratcoski, 1990; Lewis et al., 2006; Stanback & King-Kallimanis, 2011). Older women are most often killed in the home by a spouse or other family member (Salari & Maxwell, 2016). Understanding spousal relationships may be one important way to identify households at risk of violence (Stanback & King-Kallimanis, 2011). All of the studies on homicide-suicide involved the killing of a spouse/partner or a victim in a domestic relationship. Care-giver roles towards the victim were found to be common in some studies. It was also common for the offender to have a past diagnosis of a psychiatric or alcohol use problem. Active episodes of a mental illness were also found to be prevalent.

The use of firearms was found to be common but varied between the regions studied. This could be explained by differences in social attitudes to firearms, access levels and local firearms laws which should prompt further reviews of firearms legislation. The proportion of firearms-related homicide was particularly high in the United States studies,

likely to be due to the availability of access to firearms, which is enshrined in their Constitution. Myers et al. (2017), in their study which examined cases of sexual homicides only, found that 22% of offenders used firearms. The rate of non-sexual homicides by firearms ranged from 69% (Fazel et al., 2007) to 100% of cases (Malphurs & Cohen, 2005). The rate of firearms-related homicides was comparatively less common in the non-United States studies, although Cheung et al. (2016) found in their New Zealand study that 75% ($n = 3$) of homicides were by firearm. The remainder of the non-United States studies where weapon use was documented found that the rate of homicides by firearm ranged from 8%–33%. It is believed that this is largely accounted for by ease of access to firearms across the included jurisdictions, although additional cultural influences may also contribute.

This study draws attention to the scarcity of information about older homicide offenders in many regions of the world. There is a large amount of missing information about the victim-offender relationship and their health status. The gaps in the information are partly due to the nature of homicide data and the links between the different systems, that is, police, health and judicial systems. The risks inherent in the role of the elderly carer need further investigation. Whilst homicide is a low-prevalence event, there may well be other forms of non-fatal physical and mental abuse occurring at rates much higher than currently recognised.

Limitations

There were several limitations in the search methodology in this review, and any conclusions should bear this in mind. There was a large number of non-relevant results from the literature search. Contributing to this was the 'aged' term in the search and the return of numerous articles on euthanasia and end-of-life care. Broad inclusion criteria were used, as there are a small number of studies that report on older people who commit homicide. Restrictions were also placed on publication language, so studies not in English were excluded.

One of the main limitations of the studies included in this review was the use of secondary data where other sources of bias may have arisen. The methods of recording and reliability of the data synthesis used from the original data set were varied. Understandably, there was a lack of uniformity regarding the process of determining the presence of health and mental health conditions in offenders. Legal investigations were used in some studies and might not be a sensitive method of diagnosing mental illness. Overshott et al. (2012) and Hunt et al. (2010) included only homicide offenders that received a conviction. This has limitations in presenting data for those who did not receive a conviction, eg due to death, suicide or diminished responsibility, and this raises the issue of missing useful data.

In general, there was limited diversity of populations studied, that is, the studies were conducted across only three continents. There were different studies using different age cut-offs to define old age. This lack of consensus regarding what age constitutes 'old age' presents a challenge for ongoing research. Overall, there was a small number base.

Conclusions

The present study advances the current literature by synthesising the existing studies on older homicide offenders. It is the first to systematically review the existing scientific literature regarding older homicide offenders and examine the characteristics of the offenders and the context of the offences. Despite methodological issues, the findings have implications, substantiate previous findings and offer directions for future research. The authors believe that there is relevance in these findings for future practice and policy.

With the increasing emphasis on community care for dementing patients, it is a priority to establish whether there is a constellation of

risk factors related to homicidal behaviour (Ticehurst et al., 1994). Furthermore, studies are needed to investigate the household environment in the time leading to the crime to determine which characteristics are more prone to violence. A more sophisticated understanding of the pathways to offending is in part guided by earlier identification of at-risk older people and targeted social support and utilisation of legal protections in the community that could be crucial in the reduction and prevention of violent crimes (Stanback & King-Kallimanis, 2011). A review of local firearms regulation and legislation should be considered to mitigate the risk.

Some authors have promoted a need for specialist forensic services for elderly offenders (Hunt et al., 2010; Nnatu et al., 2005; Tomar et al. 2005; Yorston, 1999). Older offenders who are convicted cost three times more than younger offenders to maintain in a correctional setting (Yates & Gillespie, 2000). Further study is needed to clarify the priorities for caring for such individuals, given the ageing of our population and the increase in age-related illness. Our correctional facilities are often not designed to accommodate for the care of older prisoners. Many of these inmates are likely to age and die whilst incarcerated.

The elderly have been considered to be low risk for committing serious offences, which for too long has led to them being largely ignored as the focus of research (Yorston, 1999). Homicide is an enormous tragedy and affects more than just the offender and victim. Relatives and friends are often affected long-term. Health and criminal justice services will need to be prepared for the increase in the elderly population.

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Ethical standards

Declaration of conflict of interest

Hoa Nguyen has declared no conflict of interest.

Owen Haeney has declared no conflict of interest.

Cherrie Galletly has declared no conflict of interest.

Ethical approval

This article does not contain any studies with human participants or animals performed by any of the authors.

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